THE HONEYWELL SYSTEM OF HOTWATER HEATING

The
HONEYWELL HEATING SPECIALTY CO.

WABASH, INDIANA

MANUFACTURER OF

Honeywell Heat Generators and Other Equipment for Hot Water Heating Systems

Introduction

OUR savage ancestors laboriously kindled fires by striking sparks from flinty stones and huddled around these rude fires for warmth.

Heating, like everything else connected with human existence, has been an evolution from simple forms and practices to ever more highly developed methods.

From the smoky open fires of the savage, rude fire-places grew and developed and still survive.

As an improvement on the open fire, iron stoves were invented, adding to comfort and convenience.

The stove developed into the furnace in order to more thoroughly heat a home or building.

The furnace in its turn was largely displaced, for all better buildings, by hot water heaters and some form of steam.

Heating by hot water has continuously grown in favor, through a long period of years, on account of its many advantages; as no form of heating has ever been devised which equals it in its quality of genial warmth and its adaptability to a wide range of heating conditions.

The objections to the old-fashioned hot water plants, as originally installed, were that they were slow in operation and unwieldy on account of the large amount of water to be moved, making them irresponsive to weather conditions. The old-time radiators were large and unsightly.

No improvements in hot water heating of consequence were made until the year 1905 when what is known as the Honeywell System made its appearance on the market.

By this method of installation, the volume of water in a plant was greatly reduced; a slight and elastic pressure put on the water by a very simple and effective device known as the Honeywell Heat Generator, patented by our Mr. Honeywell, with the result that hot water heating plants were made to give a quality of service far beyond what had been thought possible.

The type of boilers and radiators now supplied by the manufacturers are in line with the development as indicated by the Honeywell System and are purposely designed to reduce as far as possible, the amount of water used.

Valuable improvements have been made from time to time in the equipment of the Honeywell System, one of the earliest being the

Honeywell Unique Radiator Valve greatly facilitating installation and circulation of the water.

Any system of heating, in order to be at its best, must be effectively controlled.

This desirable feature has been fully met by the development of the Honeywell Temperature Regulators which control the fires and temperatures in a way which would be humanly impossible. The efficiency of these regulators has long ago broadened their use until now, in addition to being used on hot water systems, they are in constant demand as part of the equipment on hot air, steam and gas plants.

The very best evidence of the success of the Honeywell System is that there are now over 200,000 plants in successful operation scattered all over the United States, Canada and foreign countries.

The demand for Honeywell Equipment is continually increasing as a result of the constant search for a higher standard of heating service.

Too Much Water

Most hot water systems require from 25 to 30 percent too much water. The heat necessary to raise the temperature of one pound of water one degree is one British Thermal Unit. To raise the temperature of one pound of water from 40 to 180 degrees, requires 140 British Thermal Units.

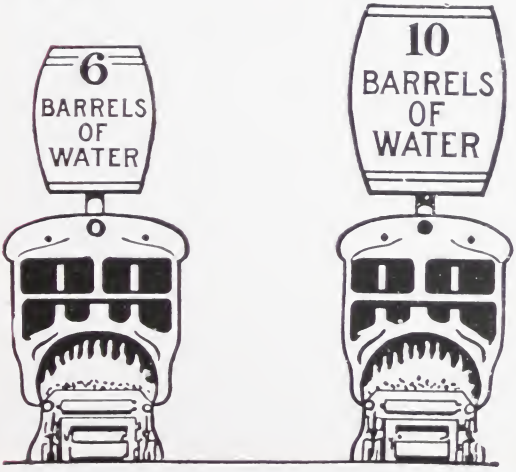
In a hot water heating plant the problem is to transpose the heat from the burning coal to the water and then to the air to be heated, with as little loss as possible.

It is a surprising fact that after years of study some one has not before discovered that it is nearly always done with almost the greatest possible waste.

Here's a homely example. On your coal stove put a tea-kettle and a wash-boiler, each filled with water. With half a pound of coal you can boil the tea-kettle, but you cannot materially change the temperature of the wash-boiler.

Why? Too much water.

Here's the application: Take a hot water heater and connect it to a system containing six barrels of water. Connect a heater of the same size to a system containing ten barrels of water. Put 25 pounds of coal in each fire box and kindle your fires at the same time.



Which system will be warmed first?

Which radiator will be giving off heat first?

In which system will the water, deprived of its

heat units, be first racing back to the boiler to get more heat units?

You would be too sensible to overload a truck and expect a diminutive pony to move it or to expect a water-logged derelict to make the same speed as a trim, correctly designed racing yacht.

You could not expect a heating plant with ten barrels of water to absorb heat from the fire, carry it to rooms and return to the heater as quickly as one with six barrels.

You could not expect a water-logged heating plant to do stunts opposed to every known physical law and accomplish work which it could easily do if it were better proportioned.

What The Honeywell System Is

The Heat Generator, the heart of the Honeywell System, is a small device which contains a few pounds of mercury and is designed to be connected to the expansion pipe of the heating system, for the purpose of controlling the expansion of the water in the system.

Application

Honeywell Heat Generator

The water heated by the boiler expands and passes through the Generator. On its way, it has to drive the load of mercury, which is 13 times heavier than the water, to the tops of the standpipes, thus sealing the entire system from the atmosphere, the pressure produced varying in exact relation to the heat requirements of the building.

With a pressure of 10 pounds applied to the water, the area of the pipes, radiator valves and radiator tappings may be made from 50 to 75 per cent less than the capacities usually employed in the old-fashioned gravity method.

Heat Generator in Operation

Eliminate Water

The prime object of reducing the size of pipes and radiators, is to eliminate every possible drop of water from the system.

These reductions mean less water to heat and less fuel to heat it; less motive power required and more supplied to drive the water through the boiler, pipes and radiators and one-half less heat wasted in transmission.

The smaller quantity of water can be heated considerably quicker than the larger quantity of the old style system and with the mercury pressure of the Honeywell Heat Generator and the Honeywell method of piping, the water is caused to circulate rapidly throughout the pipes and radiators delivering the heat from the burning fuel to the radiators very much quicker than is possible with the old style, large pipe, water-logged system, with its necessarily slow and unaided circulation.

Conserve Heat Units

Because of this higher velocity of the water, it is caused to change over the heated plates of the boiler much oftener, thus absorbing thousands more of the heat units from the fire and permitting thousands less being dissipated through the flue.

Owing to the small loss of heat in transmission and the high velocity of the water, a higher average temperature is maintained in the radiators, increasing their efficiency.

Two Hundred and Forty Degrees Possible

We positively do not advocate high water temperatures at the boiler, caused by excessive reduction of radiator surface. However, during extremely cold and windy weather, the ability to send the water temperatures soaring to 240 degrees without the annoyance of boiling, is an advantage that cannot be overestimated and makes the Honeywell System of the same efficiency as steam heat.

With the old style system, 212 degrees is the highest water temperature that can be obtained with safety, as boiling takes place at this temperature when the water in the system is open to the atmosphere, thereby limiting the heat to that of the boiling point and making a large amount of radiation necessary to give the proper heat during the coldest weather.

Often the amount of radiation for a building is underestimated, and in such cases the water is frequently caused to boil before the rooms are comfortably heated.

Highest Efficiency

With the Honeywell System, the water is sealed from the atmosphere by the Generator, which does not permit the water to boil until it reaches a temperature of 240 degrees, an increased efficiency of about 50 per cent over the old style system. This temperature, while scarcely ever needed, causes the system to be adequate to meet the most severe winter weather.

Low Even Temperature

In contrast to this extremely high water temperature what can easily and quickly be obtained with the Honeywell System, is a temperature of 100 degrees or lower. At this very low temperature, the water will circulate positively and rapidly through each and every radiator in the plant and for frosty mornings and chilly evenings impart that mild, genial warmth that only the hot water system of heating can produce.

For Mild Weather

Owing to its elasticity or wide range of temperatures the Honeywell System is adaptable to any climate, no matter how mild, extremely cold or changeable.

It is desirable for mild climates, because the water will circulate quickly through all radiators at 100 degrees or lower and for extremely cold climates, because it will heat at 240 degrees (hotter than steam) if necessary, and in changeable weather or climate because it will heat and cool quickly; thereby operating with the minimum amount of fuel.

Next to economy, efficiency and sightliness to be considered in a hot water heating system, is cost, which is all important. Owing to the saving in pipe, fittings and other materials, the Honeywell System can be installed at a lower cost than can the old style, large pipe system.

Engineering Advice

We co-operate with architects and heating contractors handling the Honeywell System, and if your job is a difficult one to pipe or is out of the ordinary, we will work with the architect and contractor in designing the system for the building. The contractor thus has the advantage of our broad experience and engineering advice and you are doubly assured of a perfectly successful and satisfactory working system, for if your contractor will follow our plans and general instructions, we will absolutely guarantee the satisfactory operation of your job.

The Honeywell Tank-in-basement Method of hot water heating —where the expansion tank is placed in the basement—has numerous advantages. It can be used in preference to the Honeywell Regular method in special cases, such as bungalows, one-story or flat-roofed buildings, or any building, where on account of danger of freezing, lack of suitable place, or unsightliness, it is not possible to locate the expansion tank above the radiation.

A Honeywell Heat Generator, built in heights to suit the number of stories of the building in which it is installed, holds the water up in all radiators and at the same time gives positive relief to the

system. In fact, it operates exactly like the Honeywell Regular method with the exception that the expansion tank is placed in the basement instead of above the radiation.

It Cannot Boil

On account of the water being held up in the Tank-in-basement system by artificial means, it must not boil. Should boiling take place, any accumulation of steam would quickly force the water down and out through the relief pipe.

While a water temperature of 240 degrees can be easily obtained in the Honeywell Tank-in-basement system, it is at all times prevented from boiling. This feature is automatically controlled by a No. 30 Honeywell Water Regulator which is operated entirely by water temperatures. This extremely simple regulator has no packed joints or rubber diaphragm to wear out and will keep the water at any temperature between 100 and 220 degrees, opening and closing the dampers within a water temperature change of 2 to 3 degrees, as may be desired.

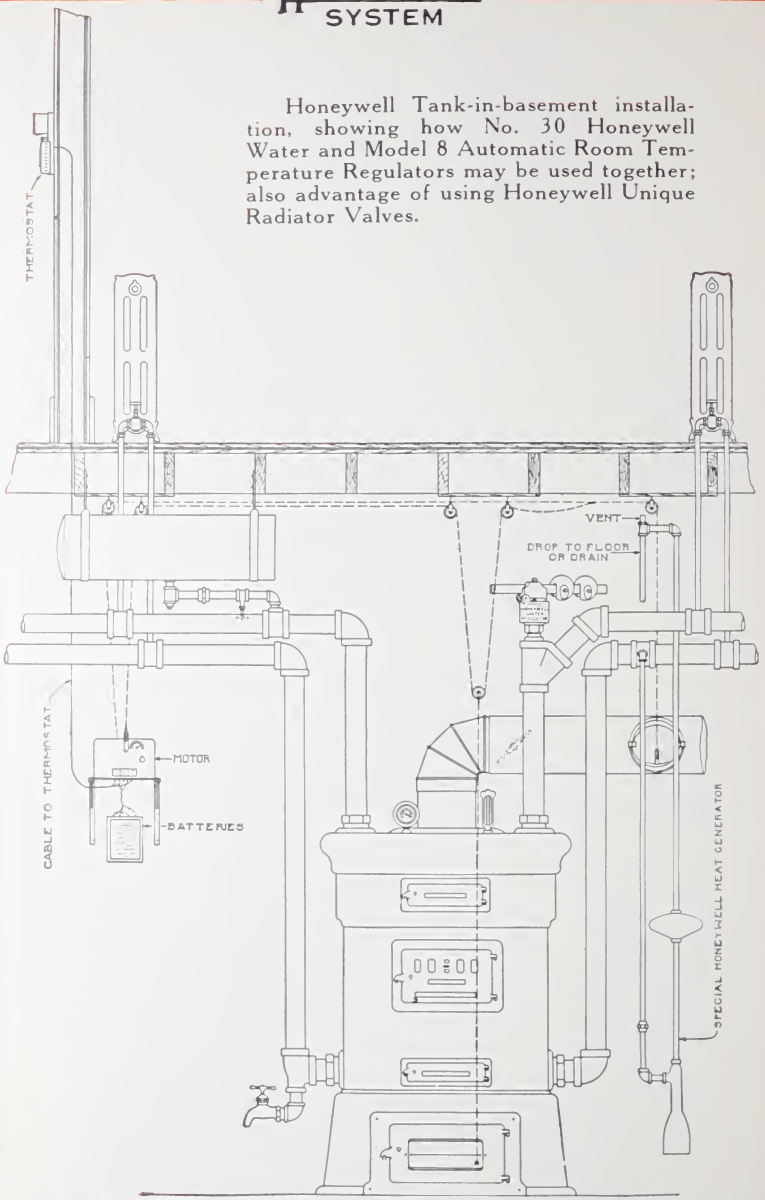
Simple In Operation

A hot water plant installed in connection with our Tank-in-basement equipment needs no more attention than a common system. It is filled in the same manner, and so far as operation is concerned, one would not know but that the tank was located above the highest radiators.

Honeywell Tank-in-basement Equipment is built especially for the purpose of enabling the expansion tank to be placed in the basement —with absolute safety—without trouble. There is nothing about it to get out of adjustment, wear out, or give trouble.

HONEYWELL SYSTEM

Honeywell Tank-in-basement installation, showing how No. 30 Honeywell Water and Model 8 Automatic Room Temperature Regulators may be used together; also advantage of using Honeywell Unique Radiator Valves.



The Honeywell Regular Method of hot water heating—where the expansion tank is placed above the radiators—has met with an ever-increasing favor since its appearance fourteen years ago. It is to be found working with perfect satisfaction in every civilized country where artificial heat is required.

Comparison can scarcely be made between the old style large pipe, slow circulating, uncontrolled hot water of the ordinary type, and the hot water heating made entirely automatic by Honeywell equipment and methods. In the former, the large body of water heats and circulates slowly, often failing to heat radiators most distant from the boiler. The circulation is very feeble at low water temperatures and boils at 212 degrees.

Safe and Dependable

The Honeywell Heat Generator seals a hot water system from the atmosphere and generates a pressure of ten pounds. Water under pressure will pass over the heated plates of the boiler more rapidly, maintaining higher average temperatures in radiators, which means fuel economy. Besides, it is possible to heat the water to 240 degrees without boiling and with absolute safety.

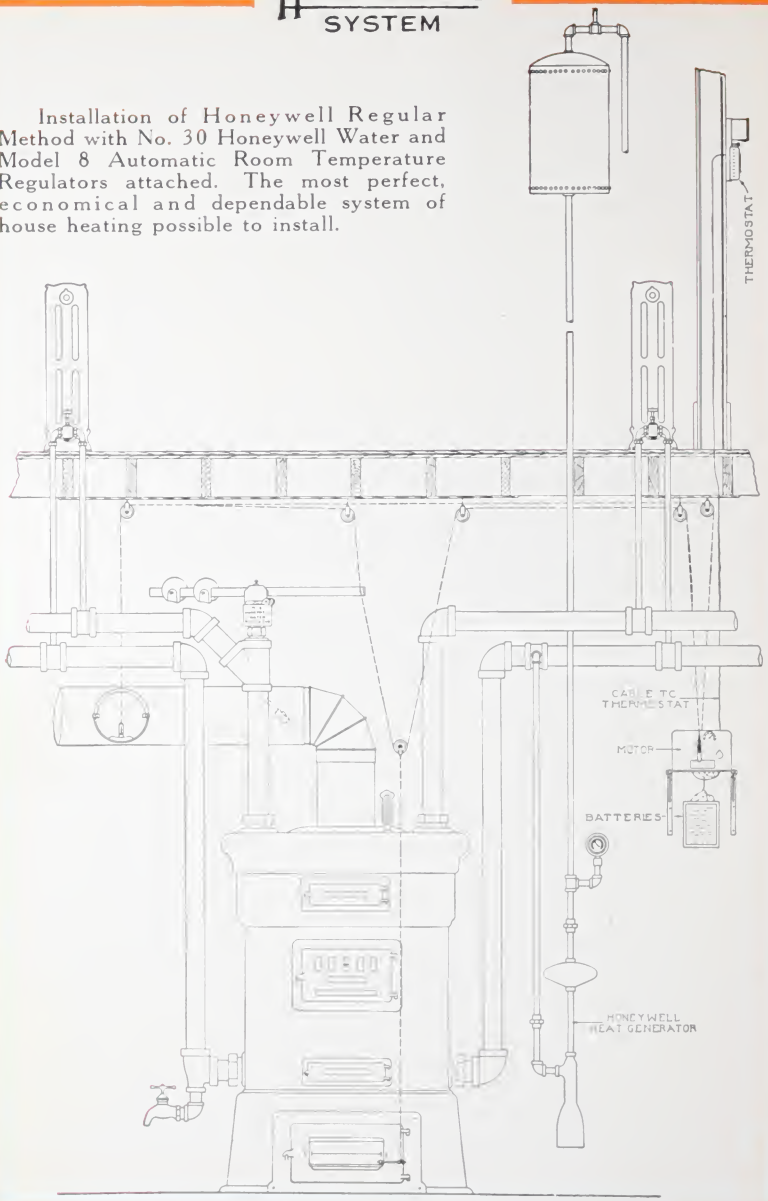
The Honeywell Heat Generator is safe, dependable and when installed according to our directions, it can be relied upon to give continued and satisfactory service, being built of cast and wrought iron will last as long as the heating plant. It requires no adjustments. There are no moving parts to corrode and create dangerous pressures or leak and become useless.

Advantage of Two Methods

You will find in the Honeywell System a solution for your most exacting heating problems. The two methods here described give every possible advantage when new work is installed, and can be relied upon to cure old-style unsatisfactory plants. Whenever it is convenient (free from danger of freezing) to place the expansion tank above the radiators, no other installation can possibly improve on the Honeywell Regular method. When the reverse of this is true, we strongly advise our very simple and dependable Tank-in-basement Method.

HONEYWELL SYSTEM

Installation of Honeywell Regular Method with No. 30 Honeywell Water and Model 8 Automatic Room Temperature Regulators attached. The most perfect, economical and dependable system of house heating possible to install.



The Honeywell Heat Generator

Figure "A"

All practical authorities agree that in hot water systems a slight pressure on the water is desirable. It causes the water to circulate more rapidly and a higher average temperature is maintained in the radiators. Because of this quick circulation, more heat units are taken from the fire, less are wasted up the chimney, and hence a mercury sealed system is more economical than any other.

The difficulty has been to apply the pressure with safety, to know positively that the pressure would never exceed the amount desired. This the Honeywell Heat Generator does, and it is the only successful device of its kind on the market that is absolutely safe. It is a physical impossibility to ever get more than ten pounds pressure on a hot water system equipped with a Honeywell Heat Generator.

It is connected to the expansion pipe (which takes care of the excess water as heat is applied to a hot water system) either near the boiler, or under the expansion tank, and in the latter location, only when Generator is attached to old existing plant when expansion pipe does not extend to basement.

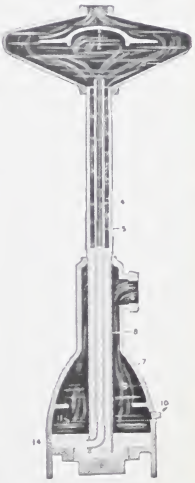


Figure "B"

The sectional views on this and the following pages will explain the operation and enable you to understand why the pressure can never exceed ten pounds.

The shell of the Generator is of iron and is tapped at the top (1) and side (6) for attachment to expansion pipe. It contains two pipes (4) and (5) through which the mercury and water circulate. The dark portion of the drawing represents water and the light portion mercury.

When the system is cold (see Figure A) the mercury (13) lies at the bottom of the mercury pot (7) about one inch in depth and on a level with (11). Before the Generator can operate, all interior parts must be filled with water.

When a fire is started in the heater, the volume of water increases and expands into the Generator at (6) and causes the water (9) to press down on the mercury (13). This forces the mercury up into the circulating tube (4) and standpipe (5).

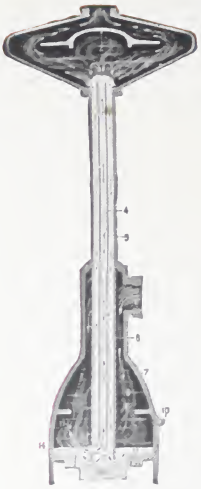


Figure "C"

As the water continues to expand, the mercury will continue to rise in both tubes and lower to a corresponding extent in the mercury pot until it lies level with the inlet (14) to the circulating tube. (See Figure C.) At this time the mercury has reached the top of the two tubes. The water, having forced the mercury slightly below the inlet (14) passes into the circulating tube (4.) Water being over 13 times lighter than mercury, will pass very rapidly through this tube, constantly carrying small quantities of mercury with it.

When the water and the mercury reach the top of the circulating tube, the water passes up and around the deflector (2) and out through opening (1) to the expansion pipe and tank.

The mercury which is driven upward with the water in circulating tube (4) will not return through the same tube, but falls into the space (8) between it and the outer tube and drops back to the lower part (15) of the mercury chamber, thus raising the mercury level again and closing the inlet (14.)

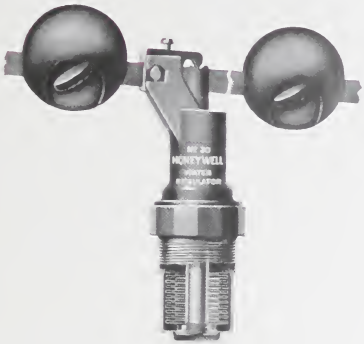
From the above description, it is apparent that a positive circulation of the mercury upward through the circulating tube (4) and downward through the standpipe (5) (as indicated by the arrows in C) is attained under all normal working conditions, thus positively retaining the mercury in the circulating tubes of the Generator.

It is also apparent that a 10-pound pressure will be produced and maintained and at the same time permit all excess water of expansion to pass freely to expansion tank.

When the water throughout the system cools and contracts, the exact reverse of the above operation takes place. The mercury will gradually lower in the tubes and rise in the mercury chamber. (Fig. B.) If the water continues to cool, the above action continues until the mercury will lie in the mercury chamber to a depth of about one inch as shown on Figure A.

No. 30

Honeywell Water Regulator



Water Regulator,
Exterior View

A most simple, positive operating and accurate instrument for regulating the temperature of water in a hot water heating system or storage tank.

It has a temperature range of from 100 degrees to 220 degrees F. and will keep the water in the system at any desired degree between these temperatures.

It is connected directly into top of heater or flow pipe in such a position that the circulating water will flow around the bulb of the regulator, which contains a volatile fluid. As the temperature increases, the fluid expands a seamless bellows, tilting the lever and moving the dampers. This operation is reversed as the water cools.

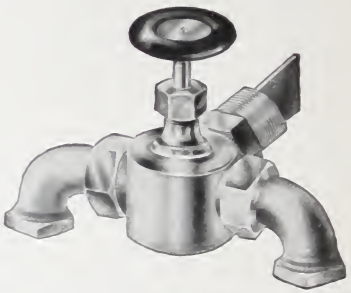
By placing the two ball weights furnished with the regulator in different positions on the lever, any desired temperature of the water may be maintained.

This instrument is a great fuel and labor saver and requires no personal attention to insure proper operation. The regulator is constructed entirely of metal; there are no short-lived parts to wear out or give trouble.

The No. 30 Regulator is threaded for 2-inch iron pipe opening, and is so designed that it can be fitted to boilers having 2-inch top tappings. It can be used in connection with the special ARCO damper control on ARCO boilers.

The Honeywell Unique Hot Water Radiator Valve

This valve provides an interchangeable flow and return connection at one end only of a hot water radiator. Its use saves labor, elbow, pipe, fittings and extra cutting and boring of floors and joists so objectionable to architects and owners. Valve permits location of the radiators in restricted floor space, where they could not go if connected at both ends.



Unique Valve

One-sixth of a turn of the handle fully opens or closes the valve. When the gates are open, all the water is caused to circulate through the radiator. When the gates are closed, the radiator is shut off, except for a small opening, and water flows through a by-pass in the valve body, the full area of the pipes. Any radiator may be shut off without preventing a constant circulation throughout entire system or without fear of freezing.

Measuring and "roughing in" work can be done with absolute accuracy as there is only one connection to make. If necessary at any time to alter size of radiator, no repiping is required, no new holes bored, no floors torn up.

Both elbows are adjustable so that connections to risers or stubs can be run in any desired direction.

Radiators yield their highest percentage of efficiency when Honeywell Unique Valves are used. Send for special circular containing full description and interior views.

Roughing-in Measurements of the Unique Valve

Size, inches	½"	¾"	1"	1¼"
Center of body to end of spud	2⅞"	2⅞"	3"	3¼"
Center to center of ells	5½"	5¾"	7"	7½"
Center of spud to bottom of ells	1⅞"	1⅞"	2"	2⅝"
Radiators should be tapped	1¼"	1¼"	1½"	2"

For details get our special Valve Folder.

CATALOGS OF OTHER HONEYWELL HEATING DEVICES SUPPLIED ON REQUEST.